Service Practices and Implications of North American Research Libraries Supporting Campus Entrepreneurship: Postprint

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Abstract

[Purpose/Significance] To investigate the overall landscape and exemplary cases of campus entrepreneurship support by North American research libraries, providing reference and insights for domestic libraries.

[Method/Process] First, a general model of library support for entrepreneurship is constructed. Then, using website investigation and literature analysis methods, the entrepreneurship support practices of multiple research libraries are examined, and the content and forms of such support are summarized.

[Results/Conclusion] Currently, North American research libraries provide support for campus entrepreneurship including: entrepreneurship literacy education and information services, entrepreneurship/maker spaces and facilities, entrepreneurship outreach activities, and micro-level institutional arrangements, among others. There remains considerable room for service improvement. University libraries in China can construct information platforms and develop entrepreneurship support services based on the support model and according to their own capacities.

Full Text

Preamble

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North American Research Libraries' Support for Campus Entrepreneurship: Practices and Implications

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Abstract

[**Purpose/Significance**] This paper investigates the overall landscape and exemplary cases of North American research libraries' support for campus entrepreneurship, providing reference and guidance for domestic libraries. [**Method/Process**] The study first constructs a general model of library support for entrepreneurship, then employs website investigation and literature analysis methods to examine entrepreneurship support initiatives at multiple research libraries, summarizing the content and forms of such support. [**Result/Conclusion**] Currently, North American research libraries provide support for campus entrepreneurship including: entrepreneurship literacy education and information services, entrepreneurship/maker spaces and facilities, entrepreneurship outreach activities, and micro-institutional arrangements. There remains considerable room for service improvement. Chinese university libraries can build information platforms and develop entrepreneurship support services based on the support model and their own capabilities.

Keywords: research libraries; campus entrepreneurship; support; makerspace
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Introduction

With economic transformation and the implementation of innovation-driven development strategies in China, self-employment and entrepreneurship have become emerging trends among university students, receiving encouragement and support from the state, society, and educational institutions. In recent years, the General Office of the State Council has issued the "Guiding Opinions on Developing Maker Spaces to Promote Mass Entrepreneurship and Innovation" and the "Implementation Opinions on Deepening Innovation and Entrepreneurship Education Reform in Higher Education Institutions," proposing multi-faceted measures covering talent quality standards, mechanisms, content, faculty, management systems, services, and support systems. These documents specifically require establishing and improving specialized entrepreneurship guidance service institutions for university students and improving entrepreneurship guidance services. In this context, a few domestic university libraries have begun participating in student innovation and entrepreneurship support activities and promoting new services. For example, the University of Electronic Science and Technology Library has built an "Innovation Laboratory," while Shanghai Jiao Tong University Library has established the "SJTU-JD Maker Space" to support campus entrepreneurship project incubation.

Academically, searching the Superstar Discovery System with "university library OR academic library" AND "makerspace" in titles, and then with "university library OR academic library" AND "entrepreneurship" in titles, reveals existing case studies on this topic. Overall, domestic library and information science research on "library support for campus entrepreneurship" suffers from several

deficiencies. First, campus entrepreneurship is a complex phenomenon whose success depends on the organic coordination of numerous temporally sequential and functionally interrelated elements. Existing literature is limited to supporting specific entrepreneurship phases, such as makerspaces or theoretical analysis of entrepreneurship education, with most studies introducing sporadic foreign cases and lacking research from lifecycle and full-factor perspectives. Second, in terms of research samples, studies are mainly confined to public library practices, and even literature involving university libraries lacks general surveys of the overall situation and adequate samples of best practices. Finally, based on these two points, existing literature has not proposed systematic and effective guiding practice models or theoretical frameworks, offering only partial imitation of foreign practices.

Since "maker" culture originated and became popular in the United States, North American (primarily U.S.) research libraries—encompassing both research university libraries and public/special libraries with strong research service functions—have pioneered support for campus or academic entrepreneurship, accumulating numerous cases. Focusing on serving research and academic exploration, these institutions provide representative and exemplary samples, making them appropriate subjects for investigating individual-level campus entrepreneurship support services and their successful operational mechanisms, thereby offering insights for Chinese libraries, particularly university libraries.

2. A Lifecycle Perspective on Campus Entrepreneurship Support Services

2.1 The Entrepreneurship Lifecycle

Entrepreneurship activities derive from "entrepreneurship," which means "innovation" and "adventure." Joseph A. Schumpeter, from an economic perspective, defined entrepreneurship as introducing new combinations of production factors and conditions into the production system, such as new products, production methods, markets, supply sources, and organizational forms or management models. Such activities constitute the entrepreneur's duty, and the essence of entrepreneurship is venture. As a process full of uncertainty, the broad entrepreneurship lifecycle refers to all stages from original idea through new venture creation to growth into a mature enterprise, while the narrow entrepreneurship process typically refers only to new venture creation. Researchers have proposed numerous models, with representative ones including: (1) J. Galbraith's five-stage model (proof of principle, prototype, model shop, launch, and natural growth), where each stage may face varying degrees of employee relations, financial management, marketing, product manufacturing, and technology development issues; (2) N. C. Churchill and V. L. Lewis's complex five-stage model (existence, survival, success, take-off, and resource maturity); (3) J. A. Timmons's dynamic adjustment model viewing entrepreneurship as a dynamic interaction among resources, opportunities, and team relationships; and

(4) D. H. Holt's four-stage model (pre-startup, startup, early growth, and later growth), analyzing activities at each stage.

These models demonstrate that entrepreneurship is a complex dynamic process involving interaction among entrepreneurs, other members, and the environment, with both differences and commonalities across individuals, industries, and regions. Only by accurately identifying the entrepreneurship process and properly matching elements to solve corresponding problems can the entrepreneurial ecosystem evolve. Therefore, entrepreneurship is a process of seeking and utilizing support, and campus entrepreneurship similarly requires external support.

2.2 A General Model of Campus Entrepreneurship Support

Campus entrepreneurship subjects primarily include students, faculty, and other staff. Support for entrepreneurship mainly involves: (1) entrepreneurship education and information consulting, such as entrepreneurship capability development, information and platforms, projects, technology, and evaluation; (2) space and facilities, including laboratories, studios, incubators, and business premises; (3) funding, including fee reductions, entrepreneurship funds, credit, and taxation; (4) public opinion and social networks, including entrepreneurship atmosphere, family and alumni relationships, role models, and alliances; and (5) institutional arrangements/policies and regulations, including fiscal, tax, insurance, industrial, and commercial policies. Supporting entities include government, social organizations (such as enterprises and banks), university departments, families, and other individuals. As the university's information and knowledge center, and given that students' primary task is learning and knowledge innovation, their on-campus entrepreneurial activities may not necessarily produce physical enterprises but may serve as "rehearsals" for post-graduation entrepreneurship. A typical activity is entrepreneurship competitions and their outcome incubation, which has become the focus of various support themes.

Based on the above, this paper summarizes library support for the campus entrepreneurship lifecycle, as shown in Table 1 :

Table 1. Library Support Model for Campus Entrepreneurship

(Note: Level of support or resource investment: = low, = medium, = high, = very high)

The library support model for campus entrepreneurship has three major characteristics: (1) **Entrepreneurship lifecycle problem orientation.** Every stage of the entrepreneurship lifecycle involves numerous problems, including information- and knowledge-related issues. Only by successfully solving these problems can entrepreneurship advance to the next stage. Problem content and timing determine users' demand for entrepreneurship support, which constitutes the library's service selection set. (2) **Resource orientation.** Resources such as collections, information, space, facilities, staff capabilities, and funding,

along with other mobilizable general resources, determine the possible set of entrepreneurship support options. Libraries cannot break through their overall resource constraints to support entrepreneurship and must balance resource allocation between entrepreneurship support and other business activities to maximize performance and satisfaction. (3) **Organic matching.** Libraries often limit their operations to resources, especially tangible ones, adopting an "inside-out" mindset that typically constrains managers. Therefore, they must combine this with "outside-in" thinking to match resources with user needs and seek balance. Generally, libraries possess literature and information advantages with information service capabilities and platforms, making entrepreneurship education and information services a high-investment option for the early entrepreneurship stage. However, most libraries are not currently skilled in later-stage entrepreneurship activities. New ventures are highly uncertain, and excessive involvement is neither necessary nor possible. The same applies to other support options, distinguished by different numbers of in Table 1.

3. Overall Situation of North American Research Libraries' Support for Campus Entrepreneurship

This study determined its overall investigation framework based on Table 1. First, using literature analysis, it interpreted the 2017 ARL (Association of Research Libraries) report "SPEC Kit 355: Campus-wide Entrepreneurship" [10] to outline the general situation of research libraries' support for campus entrepreneurship. Then, by visiting the "List of ARL Members" website [11], it conducted web-based investigations and analysis of specific initiatives at various libraries to summarize concrete content and practice models. The overall situation is as follows:

3.1 Understanding of Entrepreneurship Support

A considerable number of libraries (50 out of 60 respondents, or 83%) have recognized to varying degrees the importance of supporting entrepreneurship and made it a strategic priority, with goals including increasing research commercialization, technology transfer and licensing, and public-private partnerships. Target populations include women and veterans (ARL members include non-university libraries). About half of the libraries indicated they would provide more in-depth, customized, and diverse support in the future and collaborate with other campus departments such as student clubs.

3.2 Participating Departments and Personnel

3.2.1 Position Structure for Entrepreneurship Support

Most libraries (37) have not created dedicated positions to primarily manage or coordinate campus entrepreneurship support services; 12 libraries have established specialized positions, such as Entrepreneurship Librarian, with 5 libraries creating management titles and the remainder assigning responsibility to liaison

librarians. Respondents believed business librarians and engineering librarians are well-suited to provide entrepreneurship services, while the multidisciplinary nature of entrepreneurship requires librarians to possess entrepreneurial capabilities and teamwork spirit. As shown in Table 2 :

Table 2. Entrepreneurship Position Structure

Library	Position	Qualifications (including experience)	Responsibilities
Georgetown University Library	Maker Hub Manager	Bachelor's degree; Experience: 5 years in makerspace or similar institutions, 2 years teaching experience; Technical qualifications: Visual arts or maker movement background and tool capabilities, using digital media software, electronics, and programming microcontroller experience	Regular management of Maker Hub, training and consulting users on facility use, project design and completion, managing student staff (recruitment, training, mentoring, coordination, and evaluation), community building, professional development (serving or participating in professional organizations, skill development)

Library	Position	Qualifications (including experience)	Responsibilities
University of Kentucky (UK) Libraries	Business Researcher (student position in Reference Department)	ALA-accredited Master's in Library Science; Communication and interpersonal skills, service commitment, collaborative and independent work ability, balance, attention to detail, academic ability, commitment to continuous professional development; Ideal qualifications: Knowledge of market research techniques and business information resources, experience engaging with small business owners, entrepreneurs, and startups, ability to deliver library value	20 hours/week providing indirect market research for UK Small Business Development Center advisors, searching UK business databases and other resources for articles and reports needed by entrepreneurs, writing result summaries
University of Massachusetts Amherst	Entrepreneurship Librarian	Participate in US Patent and Trademark Office annual training conferences, attend online seminars from other organizations such as WIPI and UPOD when possible, conduct patent and trademark (PT) training sessions, assist in PT classroom teaching, provide PT information and consulting services to users, provide PT education on and off campus	

Library	Position	Qualifications (including experience)	Responsibilities
Michigan State University Gast Business Library	Patent & Trademark Resources Center Representative	General business consulting and education services; In-depth professional services for entrepreneurship and small business development, supply chain management, corporate social responsibility; Maintain effective connections with designated departments and subject areas; Integrate business library services with campus entrepreneurship programs and minors; Co-teach and guide entrepreneurship courses; Develop and market specialized services to users, demonstrate business library resources; Supervise makerspace, manage makerspace administrators, develop projects to promote its services; Select appropriate business literature for the library and disseminate to users; Assist with library resource use; Participate in professional organizations and actively play roles in entrepreneurship field; Research and publishing activities	
New York University Library	Librarian for Business and Economics (tenure-track)	ALA-accredited MLS and subject Master's (business, real estate, economics, etc.), statistics, database skills, public service spirit, familiarity with 21st-century library technology, relevant experience in library instruction, consulting, and outreach services, communication, collaboration, and innovation skills; Preferred: Advanced degree in economics, statistical analysis	Training, consulting, research support, information services, information literacy, R&D research capability projects, outreach services, commitment to library-college cooperation

Library	Position	Qualifications (including experience)	Responsibilities
Virginia Tech University Library	3D Design Studio Manager & Renovations Support Specialist	Required: 3D printing technology, modeling software and application skills, 2 years supervisory experience, other management skills; Preferred: Design, architecture, or engineering background	Supervise daily studio operations, monitor technology and equipment, implement studio policies and activities, supervise student staff, support learning environment (including learning space) planning, participate in and support library innovation projects
	Fusion Studio Manager and Learning Space Assessment Coordinator	Must have Master's or higher degree, with interdisciplinary collaboration, communication, and project management skills; Preferred: Core library liaison, space management, grant proposal writing	Supervise and coordinate studio operations, design, implement, evaluate, and optimize learning spaces

3.2.2 Organization of Diverse Entrepreneurship Activities

University campuses host numerous entrepreneurship support activities from different institutions that operate independently, collaborate loosely, or coexist in other structures. Nearly three-quarters of libraries do not play a guiding or coordinating role in these activities, though some library staff serve as advisory or steering committee members for campus entrepreneurship initiatives.

3.2.3 Partnerships

Partners include technology transfer offices, colleges, incubators, accelerators, existing campus entrepreneurship centers, and teaching and learning centers.

Collaborative activities include demonstrations/training, business cooperation, co-funding of activities, cross-promotion, data services, visualization and digital scholarship services, maker services, business plan competitions, and hackathons.

3.3 Support Content

North American research libraries' support for campus entrepreneurship primarily includes: (1) Most libraries offer diverse and continuous support forms, primarily through business librarians. (2) Resources for entrepreneurship support activities: books, specialized databases, and reference materials rank as the top three resources, with funding mainly from general library, business library, branch library budgets, college budgets, donations, and other channels. Supported populations include students, faculty, staff, the public, alumni, and business community members. Meanwhile, nearly half of respondents indicated that other university institutions purchase resources (such as business databases) to support entrepreneurship. (3) Service programs for entrepreneurship support: Most libraries provide reference consulting, training, in-depth research, market research coaching, patent searching, 3D printing, and online entrepreneurship guides. Service locations typically coincide with resource locations, with main campus libraries and branch libraries (such as engineering, medical, science, and business libraries) serving as service hubs. Core users are students, faculty, and staff. (4) New funding for entrepreneurship: Libraries do not have new or additional funds specifically designated for supporting campus entrepreneurship; even when funds come from other sources, they are designated for resources, space, and equipment expenses. (5) Outreach activities: The most common include continuous liaison outreach, subject guides, dedicated websites, regular contact with other institutional staff, and participation in network events; others include cross-promotion through other websites, email, newsletters, social media, workshops, exhibitions, and innovation competitions.

4. Practical Content of North American Research Libraries' Support for Campus Entrepreneurship

Problems encountered in entrepreneurship determine the content and extent of library support. Table 1 shows demand for the five major resources at each stage, though the degree of demand for any particular resource varies. For example, the education, rehearsal, and planning stages have stronger needs for library-provided information and knowledge than funding, while the establishment through rapid growth stages obviously require substantial funding—something libraries are not primarily positioned to address. The decline or transformation stage involves difficulties such as product stagnation, reduced cash flow, and personnel aging or reduction that typically exceed libraries' capabilities and resources. Therefore, current library support for campus entrepreneurship mainly targets early-stage ventures. Common content includes:

4.1 Information Services

4.1.1 Entrepreneurship Process Guidance (Library Guides)

Libraries provide full lifecycle entrepreneurship services on their websites under names or sections such as "Guide for Entrepreneurs," "Entrepreneurship Support," "Entrepreneurship," or "Entrepreneurship & Innovation." Through browsing multiple library websites, entrepreneurship guide information generally includes: (1) Getting started guides, idea generation, feasibility studies (such as business feasibility analysis techniques and samples), business plans (such as entrepreneurship analysis and financial ratios); (2) Industry and market research (such as competitors, consumers, industry ratios and benchmarks, economic environment), costs, financing and venture capital, marketing; (3) Family businesses, social entrepreneurship, university business incubators, directories of business support experts or institutions, or company and industry news; (4) Academic resources, research data management, analyst reports, original research, and interview tools; (5) Statistics or demographic data (U.S. and other countries), visualization tools, patents and trademarks (U.S., European, and other global data), specialized databases, various standards and specifications (technical definitions and guidelines, regulations, and instructions covering design, production, operation, use, and recycling); (6) Space and equipment, workshops and training (such as entrepreneurship research, graduate research commercialization, 3D printing training), campus resource or community website links; (7) Other supplementary resources, off-campus access instructions, and librarian assistance/contact information. These resources take forms such as articles, books, videos, and hyperlinks, typically featuring titles, content descriptions, authors, and access paths, presented attractively with text and images for easy user access.

4.1.2 Entrepreneurship Education Course Resources

Course content revolves around skills and knowledge needed throughout the entrepreneurship lifecycle. For example, Emory University Library [12] offers Entrepreneurship and New Venture Development (covering business plans, industry and competitors, market share and forecasting, target markets, operations, and financing); Florida State University Library's Business Model Workshop (covering key partners, key activities, key resources, value propositions, customer relationships, channels, customer segments, cost structure, and cash flow modules); University of Missouri-Columbia Libraries' Entrepreneurship Bootcamp for Veterans [13]; and Iowa State University Library [14] offers "Entrepreneurship in Human Sciences" (focusing on entrepreneurship issues in apparel retail, restaurant/hospitality management, and child care). Course formats combine online and offline, short-term training and credit courses, librarian-led and guest expert/entrepreneur-led sessions, providing users with rich options.

4.1.3 Intellectual Property, Patent, and Trademark Services

Beyond providing intellectual property, patent, trademark, and trade secret information through "entrepreneurship guides," many libraries offer specialized

IP sections to help users protect their rights and avoid infringement risks. The University of Illinois at Urbana-Champaign Library's Scholarly Communication and Publishing Unit [15] positions its mission as providing specialized expertise in copyright, author rights, and open access publishing for faculty and students. The University of Wisconsin Libraries' "Patents and Trademarks Overview" website [16] provides information including: distinctions between patents, patents and trademarks, and intellectual property; links to the U.S. Patent and Trademark Office; patent search strategies; patent database usage; inventor resources; trademarks; federal trademark registration; and state trademark registration processes.

4.2 Space and Facilities

Library support for campus entrepreneurship in space and facilities concentrates on maker spaces. According to the ARL 2015 SPEC Kit 348: Rapid Fabrication/Makerspace Services [17] survey of research libraries, 64% of respondents currently provide maker space services, while 17% are investigating maker space services, demonstrating that supporting entrepreneurship through maker spaces has become or is becoming an option for an increasing number of academic libraries. Maker space support includes:

4.2.1 Space

Beyond other learning information spaces that can provide venues for academic and entrepreneurial activities, libraries strengthen implementation of this strategic priority service by renovating and adding maker spaces. Through open, innovation-conducive maker space services, users can explore, research, communicate, inspire, validate, visualize, and materialize academic ideas or entrepreneurial concepts across disciplines, where like-minded users meet and form teams, laying foundations for future success.

4.2.2 Facilities and Technology

Maker spaces are equipped with various advanced devices and technologies for experiencing, inspiring, recording, validating, and visualizing ideas, including 3D printers, 3D scanners, hand tools, laser printers, laser engraving/cutting systems, CNC milling machines, ultrasonic cleaners, and other equipment (such as motion controllers, starter kits, digital cameras, sensors, VR headsets, Mac computers, gaming computers, HD cameras, digital microphones, graphics tablets, planetary digital earth, audio controllers, smart custom digital surfaces, game controllers, drill presses, soldering irons, industrial sewing machines, small drones, large-format printers, microcontrollers, motors, and switches). Correspondingly, these devices are equipped with operating software such as 3D design and conversion software, generally provided free of charge with established management systems.

4.3 Outreach Activities and Entrepreneurship Events

4.3.1 Outreach and Training Activities

Libraries attract and encourage users to utilize maker spaces through various activities such as show-and-tell sessions, e-newsletters, social media, participation in local gatherings, embedding in faculty courses, collaboration with student organizations, and hosting maker competitions. To help users utilize maker spaces, libraries provide: (1) various usage assistance including user guides and rapid fabrication technology collections (documents, manuals, books, databases, etc.); (2) consulting services such as model retrieval and selection, software consulting and downloading, and design consulting; (3) document archiving; and (4) skill development activities such as workshops, course lectures, online seminars, and web videos.

4.3.2 Specialized Entrepreneurship Competitions or Maker/Hackathon Events

To centrally mobilize library resources to support campus entrepreneurship, many libraries conduct entrepreneurship competitions or maker/hackathon events while actively participating in entrepreneurship activities initiated by other university departments. York University Libraries' Steacie branch has held annual Hackfests for multiple years, such as the 2016 theme "Making a Difference with Data," which combined the hackfest with entrepreneurship-themed new book exhibitions like "Step Into Startup Culture" [18]. Students from various disciplines, particularly computer science and engineering, fine arts, business, and digital media, propose innovative projects and solutions to existing social problems [19], with libraries providing various relevant supports including databases, open-source software, books, and guidance. North Carolina State University Libraries not only hosts the "Code + Art Visualization Contest" [20] but also collaborates with multiple on- and off-campus organizations including industry to host "Make-a-thon" competitions [21], where students identify opportunities from sustainability challenges, conduct research and design, and utilize library maker space 3D printing and other equipment to produce product prototypes for evaluation, with some projects eventually becoming actual products with funding support.

4.4 Institutional Arrangements and Other Support

According to the support model for campus entrepreneurship, beyond the three major forms of library support described above, funding, social networks, policies, and regulatory systems should also be included. According to the SPEC Kit 355: Campus-wide Entrepreneurship survey report, regarding micro-policy and regulatory system support for online resource and service use, some libraries have made certain modifications to licensing agreements, such as including "walk-in use" clauses. However, libraries do not have new or additional funds specifically designated for supporting campus entrepreneurship; even when funds come from other sources, they are designated for resources, space, and equipment expenses, with economic support for entrepreneurship

projects, particularly specific enterprises, not yet under consideration.

5. Conclusions and Implications

5.1 Establish an Integrated Entrepreneurship Support Information Platform

The Association of College and Research Libraries' survey report [22] shows that library services positively impact student learning and success, while SPEC Kit 355: Campus-wide Entrepreneurship indicates that entrepreneurship and academic innovation are multidisciplinary, multi-scenario, data-intensive projects that provide opportunities for library services.

Currently, China's university entrepreneurship is developing rapidly with multi-party social support, and various entrepreneurship elements and their information flows are complex and diverse. Libraries should leverage traditional advantages, focus on entrepreneur needs, use information as a medium, and build information and data service platforms around the entrepreneurship lifecycle to support campus entrepreneurship, as shown in Figure 1 [Figure 1: see original paper]:

Figure 1. Campus Entrepreneurship Support Information Platform

Generally, entrepreneurs first need to complete their own entrepreneurship capability and knowledge preparation, then develop or acquire corresponding entrepreneurship elements at each stage such as projects, funding, technology, facilities, and land, operating within legal frameworks. This requires collecting and processing large amounts of information that is typically scattered and uneven in quality. In Figure 1, libraries on the one hand collect information on various entrepreneurship elements and collaborate with other entrepreneurship support forces to meet entrepreneurs' general information needs (information flow direction indicated by dashed lines, with numerous dashed lines converging at the library then flowing to library users). For example, entrepreneurship funding needs can be addressed through financial and venture capital institutions, with libraries collaborating with off-campus venture capital firms to provide funding for entrepreneurs. On the other hand, through librarians' information and knowledge reserves and other library resources such as space and facilities, libraries meet entrepreneurs' specific information and other element needs, such as entrepreneurship education and rehearsals at various stages, knowledge about production management, marketing, financial management, and human resources management, and databases and operational documents for specific industries and enterprises.

5.2 Build a Multi-level Differentiated Service System

Campus entrepreneurship and innovation demands are extensive. Libraries should select feasible areas for service development based on their own capabilities, considering a five-tier service model:

(1) Basic Services: Document Resource Services
As traditional information providers, libraries should integrate and optimize domestic and international entrepreneurship and innovation resources through self-building, collaborative building, and procurement to construct a complete and institutionally distinctive entrepreneurship information service system around entrepreneurship lifecycle themes.

(2) General Services: Appropriately Providing Entrepreneurship Spaces and Facilities
Current library space services include information spaces, maker spaces, and incubation spaces, which facilitate academic innovation and commercialization of research results (i.e., academic entrepreneurship). However, due to rapid technology updates and expensive equipment requiring complex management and high human and economic costs, only a few well-resourced libraries are suitable for providing maker spaces independently or in collaboration with other campus departments, particularly appropriate for science and engineering institutions.

(3) Expected Services: Steadily expanding various activities such as entrepreneurship/business plan competitions and maker competitions; entrepreneurship education and talent evaluation, academic achievement entrepreneurship measurement and evaluation, new venture knowledge base construction and management, entrepreneurship alumni information base/thought tank construction; building collaborative social network systems to support entrepreneurship and developing social donation relationships.

(4) Extended Services: Actively exploring entrepreneurship intelligence services. SPEC Kit 355: Campus-wide Entrepreneurship indicates that faculty and students need more complex services such as customer research, product design and development, and innovative equipment usage techniques. New venture growth is a concrete process of information and knowledge application requiring large amounts of targeted and personalized intelligence services. Providing intelligence services to help enterprises grow healthily and gain competitive advantages will be a new growth point for library services.

(5) Potential Services: Management consulting or integrated full-process entrepreneurship solutions. These services exceed current library business scopes but still belong to the broad information industry, requiring substantial human capital and rich industry experience, representing possible future service forms.

Of course, these divisions are dynamic and may overlap. For example, maker spaces, previously rare forms of space utilization, are increasingly popular in university libraries.

5.3 Transform Organizations, Establish Entrepreneurship Support Positions, and Strengthen Capacity Building

The Association of Research Libraries' survey report indicates that few libraries conduct systematic evaluation of campus entrepreneurship support effectiveness; libraries lack clear strategies for future action, and campus-level entrepreneurship support strategic planning lacks coordination; users have vague awareness of library support; using electronic resources for business may be restricted; and more importantly, the root cause of these issues is the lack of excellent librarians with information literacy and entrepreneurship/management experience. These challenges require overcoming in future practice.

Given that the lack of entrepreneurship industry background talent has become a bottleneck for entrepreneurship service development, this paper recommends that libraries transform organizational structures, establish entrepreneurship innovation support positions or departments, and draw on Table 2 to add entrepreneurship support librarian positions to strengthen campus-level coordination and provide foundational support for entrepreneurship. Regarding librarian capacity building, besides expanding recruitment to include entrepreneurship talent, measures such as strengthening in-service librarian training and enhancing talent cultivation in LIS education can address these challenges.

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Note: Figure translations are in progress. See original paper for figures.